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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/516,384	07/05/2005	Evangelos Gogolides	30848/40704	4756

4743 7590 10/19/2010

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EXAMINER	
LEE, SIN J	

ART UNIT	PAPER NUMBER
1722	

NOTIFICATION DATE	DELIVERY MODE
10/19/2010	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

docket@marshallip.com

Office Action Summary	Application No.	Applicant(s)	
	10/516,384	GOGOLIDES ET AL.	
	Examiner	Art Unit	
	Sin J. Lee	1795	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *11 August 2010*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-5 and 7-14* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-5 and 7-14* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *30 November 2004* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

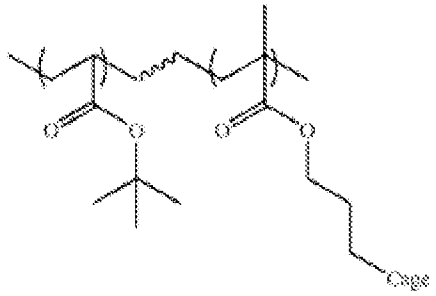
1. Upon reconsideration in view of applicant's argument, previous 112 first paragraph rejections on claims 1-13 and on claim 12 are hereby withdrawn.

Claim Rejections - 35 USC § 103

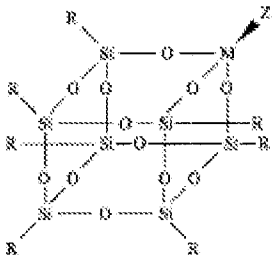
2. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

3. Claims 1-5, 9, 10 and 12-14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Angelopoulos et al (US 6,420,084 B1) in view of Lichtenhan et al (5,484,867).

Angelopoulos teaches a resist composition containing an SiO-containing polymer (see col.1, lines 58-67). Angelopoulos teaches (col.5, lines 36-66) that the SiO-containing polymer can include polymer such as the following:



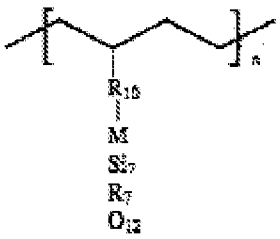
where "cage" refers to the polyhedral oligomeric silsesquioxane group. Angelopoulos refers to Lichtenhan (5,484,867) for examples of such oligomeric group (*the disclosure of Lichtenhan is being incorporated by reference in Angelopoulos*). Lichtenhan teaches (see col.6, lines 37-53) the following



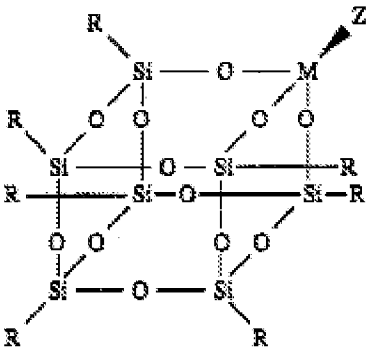
Formula 2

as one of examples for POSS group. It would have been obvious to one skilled in the art to have this group as the “cage” moiety in Angelopoulos’s polymer with a reasonable expectation of success. In Formula 2, R can be alkyl group such as methyl, *ethyl*, propyl, butyl, hexyl, heptyl, octyl and cyclohexyl groups (see col.5, lines 60-65 where R groups are defined). IT would have been obvious to have R to be an ethyl group with a reasonable expectation of success. Angelopoulos’s resist composition contains a photoacid generator (see col.6, lines 54-55). Angelopoulos’s positive resist is applied to a substrate on which material layer is pre-applied. The resist film is exposed to imaging radiation and then developed (see col.7, lines 45-67, col.8, lines 1-14). Angelopoulos teaches that his resist layer can be exposed to deep UV radiation (see col.8, lines 34-36). Thus, Angelopoulos in view of Lichtenhan render obvious present inventions of claims 1-5, 9 and 10. Angelopoulos states (col.6, lines 37-46) that in general, his polymer should contain *at least about 5 wt.%* SiO moiety (such as POSS group). Since this range overlaps with present values of claims 12 and 13, the prior art’s teaching renders obvious present inventions of claims 12 and 13 prima facie obvious. In the case "where the [claimed] ranges overlap or lie inside ranges disclosed by the prior art," a prima facie case of obviousness would exist which may be overcome by a showing of unexpected results, In re Wertheim, 541 F.2d 257, 191 USPQ 90 ICCPA 1976).

With respect to present claim 14, as discussed above, Angelopoulos refers to Lichtenhan for the examples of POSS-grafted polymers. Lichtenhan teaches (see col.4, lines 13-31) the following homopolymer;



in which R10 is a vinyl or other olefinic group and MSi7R7O12 is the polyhedral oligomeric silsesquioxane having the formula shown below;



Formula 2

As discussed above, in Formula 2, R can be alkyl group such as methyl, *ethyl*, propyl, butyl, hexyl, heptyl, octyl and cyclohexyl groups (see col.5, lines 60-65 where R groups are defined). IT would have been obvious to have R to be an ethyl group with a reasonable expectation of success. IT would have been obvious to one skilled in the art to use such POSS-grafted homopolymer shown above in Angelopoulos's resist composition with a reasonable expectation of success. Thus, Angelopoulos in view of Lichtenhan render obvious present invention of claim 14.

4. Claim 11 is rejected under 35 U.S.C. 103(a) as being unpatentable over Angelopoulos et al (US 6,420,084 B1) in view of Lichtenhan et al (5,484,867) as applied to claim 1 above, and further in view of Nishi et al (US 2002/0150835 A1).

Angelopoulos et al in view of Lichtenhan does not teach present meth(acrylate)monomer having a hydrophilic group (although its copolymer as discussed above contains a meth(acrylate) monomer having a protected hydrophilic group). It is known in the art that presence of (meth)acrylic acid repeat unit in a polymer imparts sensitivity and resolution characteristics to a resist composition, as evidenced by Nishi, [0012]. It would have been obvious to one skilled in the art to incorporate an (meth)acrylic acid repeat unit into Angelopoulos's copolymer (as discussed above) with a reasonable expectation of obtaining improved sensitivity and resolution in his resist composition. Thus, Angelopoulos in view of Lichtenhan and further in view of Nishi render obvious present invention of claim 11.

5. Claims 7 and 8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Angelopoulos et al (US 6,420,084 B1) in view of Lichtenhan et al (5,484,867) as applied to claim 1 above, and further in view of Lin et al (US 6,344,305 B1).

As discussed above, Angelopoulos teaches that his resist composition can be exposed to deep UV radiation. In the art, "deep-UV radiation" is known to include 248 nm, 193 nm and 157 nm radiation as evidenced by Lin, col.1, lines 22-23. Since Angelopoulos teaches that deep UV radiation can be used, it would have been obvious to one skilled in the art to use 157 nm radiation (which is known in the art as one of deep-UV radiation) in Angelopoulos's exposure step with a reasonable expectation of

success. Thus, Angelopoulos in view of Lichtenhan and further in view of Lin render obvious present inventions of claims 7 and 8.

Response to Arguments

6. Applicants argue that there is no teaching or suggestion in Angelopoulos or Lichtenhan to select the alkyl substituents of the POSS group which are not linked to the main chain of the polymers disclosed therein to have up to 3 carbons. Specifically, applicants argue that Lichtenhan does not suggest the use of a POSS group in a polymer for use as a lithographic material. However, applicant's such argument is not persuasive because Lichtenhan is actually being incorporated by reference in Angelopoulos (see col.5, lines 44-50). Applicants argue that Lichtenhan does not provide motivation to selectively choose alkyl group having up to 3 carbons as the R substituent of the POSS structure, as recited in present claim (whereas the reference *Wu et al* discloses the intentional selection of cyclopentyl substituents on the POSS group). The Examiner disagrees. Lichtenhan clearly teaches that R groups of his POSS moiety can equally be chosen from alkyl groups (such as methyl, ethyl, propyl, butyl, hexyl, heptyl, octyl and cyclohexyl group), aryl groups, alkenyl groups or alkoxy groups (and applicants *have not shown* <u>*successfully*</u> that methyl, ethyl and propyl groups give superior results over those other groups listed in Lichtenhan, for example, butyl, hexyl, heptyl, octyl, cyclohexyl, aryl, alkenyl or alkoxy groups). Since there are not that many to choose from, and since Lichtenhan clearly names ethyl group as one of examples for the R group, it is the Examiner's position that one skilled in the art

would sufficiently be motivated to choose ethyl groups as the R groups with *a reasonable expectation of success*.

Applicants argue "unexpectedly superior" results of present invention by pointing to Examples 3 and 4 of the present application. First of all, Example 3 does not represent present embodiment of a random copolymer because the example uses a homopolymer. Even though applicants argue that the advantages of using polymers comprising methacrylethyl-POSS monomers relative to polymers comprising MethacrylCyclopentyl-POSS monomers are best shown by comparing the corresponding homopolymers, such argument is not found to be persuasive in overcoming present rejection based on the fact that present claims 1-5 and 7-13 are drawn to copolymers not homopolymers. That is, the methacrylethyl-POSS homopolymer used in Example 3 *does not represent* present invention of those claims. Also, the comparison shown in Example 4 does not seem to be fair because, for *each* of the copolymers (that contain either methacrylcyclopentyl POSS or methacrylethylPOSS), the kinds and the amounts for the co-monomers are different. Also, the use of methacrylethyl POSS is not commensurate in scope with present claims 1-3, 7 and 9 because those claims recite “up to 3 carbon atoms.” See MPEP 716.02(d); whether the unexpected results are the result of unexpectedly improved results or a property not taught by the prior art, the “objective evidence of nonobviousness must be commensurate in scope with the claims which the evidence is offered to support.” In other words, the showing of unexpected results must be reviewed

to see if the results occur *over the entire claimed range*. Applicants argue that one skilled in the art would ascertain that the results obtained using an ethyl substituent as exemplified in Examples 3 and 4 can be reasonably extended to other alkyl substituents having a similar size to ethyl groups. However, even if applicants' such argument were correct, applicants should compare *a sufficient number of tests* both inside and *outside* the claimed range (in the instant case, the claimed range being 1-3 carbons) to show the criticality of the claimed range. In re Hill, 284 F.2d 955, 128 USPQ 197 (CCPA 1960). See MPEP 716.02(d). In the instant case, there is only one data point (which is a cyclopentyl group) shown outside of the claimed range. *Similarly*, although applicants argue that Example 3 of present specification show unexpectedly superior results of present invention of claim 14, the only comparison made in Example 3 was between the ethyl group vs. the cyclopentyl group. Finally, the comparison was not made to the closest prior art. Applicants argue that the methacrylcyclopentyl-POSS monomer disclosed by Wu is the closet prior art. However, as discussed above, such argument is not persuasive because in present claims, copolymers (not homopolymers) are being claimed. See MPEP 716.02(e); An affidavit or declaration under 37 CFR 1.132 must compare the *claimed* subject matter with the closest prior art to be effective to rebut a prima facie case of obviousness. In re Burckel, 592 F.2d 1175, 201 USPQ 67 (CCPA 1979). "A comparison of the claimed invention with the disclosure of each cited reference to determine the number of *claim limitations in common* with each reference,

bearing in mind the relative importance of particular limitations, will usually yield the closest single prior art reference." In re Merchant, 575 F.2d 865, 868, 197 USPQ 785, 787 (CCPA 1978) (emphasis in original).

7. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Sin J. Lee whose telephone number is 571-272-1333. The examiner can normally be reached on Monday-Friday from 9:00 am EST to 5:30 pm EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Cynthia Kelly, can be reached on 571-272-1526. The fax phone number for the organization where this application or proceeding is assigned is **571-273-8300**.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

/Sin J. Lee/
Primary Examiner, Art Unit 1795
October 12, 2010